

REMARKS

Claims 1-30 were pending. Claims 1, 13 and 25 have been amended. Claims 31-49 have been added. After entry of the amendment, claims 1-49 should be pending.

Claim Amendments

Claim 1 has been amended to recite that "the retaining ring is removable from the base as a unit without disassembly of the carrier head." Support for this amendment may be found at page 11, lines 5-7, which notes that the retaining ring 110 is secured by bolts 194, by the described implementations for joining the lower portion to the upper portion, and by Figures 2 and 3.

Claim 13 has been amended to recite that "the lower portion is secured to the upper portion and the top surface is configured such that the retaining ring is removable as a unit from the base." Support for this amendment may be found at page 11, lines 5-7, which notes that the retaining ring 110 is secured by bolts 194, by the described implementations for joining the lower portion to the upper portion, and by Figures 2 and 3.

New claims 31 and 35 have added that recite that "the lower portion lacks any aperture from the top surface to the bottom surface of the lower portion". Support may be found in Figures 2 and 3, which illustrate the lower portion without any apertures from the top surface to the bottom surface, and in the described implementations for joining the lower portion to the upper portion, e.g., an adhesive layer, which permit connection without apertures through the lower portion.

Support for new claims 32-33 and 47-48 can be found at page 13, lines 3-7.

Support for new claims 34 and 49 can be found page 11, lines 15-18, and by Figures 2 and 3, which illustrate the annular retaining ring with vertical inner and outer side surfaces.

The Examiner is reminded that compliance with 35 U.S.C. 112 requires only that the applicant's disclosure, taken as a whole, convey to persons of ordinary skill that the inventor was in possession of the claimed invention at the time of filing. See *In re Wilder*, 736 F.2d 1516, 1520 (Fed. Cir. 1984). The content of the drawings may also be considered in determining

compliance with the written description requirement. *In re Kaslow* 707 F.2d 1366, 1375 (Fed. Cir. 1983). In some cases, the *drawings alone* may constitute an adequate description. See *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1564 (Fed. Cir. 1991).

Various other minor amendments have been made in claims 1, 9, 21 and 22 to correct typographic errors and antecedent basis.

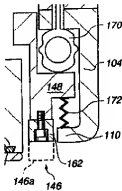
Prior Art Rejections

Claims 1-3, 5, 8-9, 12-15, 17, 20-21 and 24 were rejected as anticipated by EP 0747167 ("Shendon"). Claims 4, 6-7, 10-11, 16, 18-19, 22-23 and 25-30 were rejected as obvious over Shendon without a secondary reference. Applicant respectfully traverses the rejection.

Claims 1-49

Claim 1 recites that the top surface of the upper portion of the retaining ring is "fixed to and abutting the base." Similarly, claims 13, 25 and 35 call for an upper portion of the retaining ring with "a top surface configured to be mechanically affixed to and abut a rigid base of a carrier head."

Shendon fails to teach a retaining ring in which a top surface of the upper portion of the retaining ring is fixed to and abutting the base. Rather, as shown in Figure 4, Shendon's retaining ring assembly 146 does not touch the housing support plate 102 and is not fixed to the descending wall 104, and thus is free to move vertically relative to the housing support plate 102 and the descending wall 104. This permits the pressure of the ring assembly 146 on the polishing pad to be adjusted.



Shendon would not be modified so that the retaining ring assembly 146 were fixed to the housing support plate 102 or descending wall 104, because under such a configuration the pressure of the wafer perimeter ring 162 would not be adjustable (see column 4, lines 27-40). Thus, Shendon teaches away from a retaining ring fixed to and abutting the base.

Moreover, the Examiner appears to associate Shendon's retaining ring assembly 148 with the claimed "retaining ring". Applicant does not admit that this is a proper association. Applicant submits that a person of ordinary skill in the art would consider only the wafer perimeter ring 162, not the retaining ring assembly 146, to constitute a retaining ring.

Therefore, Applicant submits that claims 1, 13, 25 and 35, and the claims depending therefrom, are patentable over Shendon.

Claims 1-12

Claim 1 has been amended to recite that "the retaining ring is removable from the base as a unit without disassembly of the carrier head."

In addition to the reasons for patentability over Shendon as set forth above, Shendon also fails to teach a carrier head in which the retaining ring is removable without disassembly of the carrier head. In Shendon, the backing ring 148 is trapped between the housing support plate 102 and the descending wall 104. In order for the ring assembly 146 to be removed, the descending wall 104 would need to be disassembled from the support plate 102.

For this additional reason, claim 1 cannot be anticipated by Shendon, and claim 1, and the claims depending therefrom, are patentable over Shendon.

Claims 25-30

Claim 25 requires a generally annular lower portion made of a first material that has a durometer measurement between about 80 and 95 on the Shore D scale and a thickness between 100 and 400 mils.

In addition to the reasons for patentability over Shendon as set forth above, Shendon also fails to teach a lower portion of a retaining ring with a thickness between 100 and 400 mils.

The Examiner argues that the dimensions of the lower portion would have been selected for the substrate to be polished without deforming the flexible ring during a polishing process. However, Shendon fails to teach that preventing deformation of the retaining ring is desirable.

In addition, the Examiner relies on *In re Gardner v. TEC Systems, Inc.* for the proposition that where the claimed relative dimension would not perform differently than the dimensions in the prior art device, the claimed device is not patentably distinct. However, the claimed range does operate differently than other ranges. In particular, by making the lower portion relatively thin, the relative rigidity from the upper portion dominates when the retaining ring is secured to the carrier head, thus reducing or eliminating the need for "break-in."

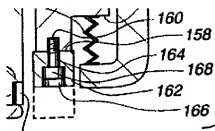
For this additional reason, claim 25, and the claims depending therefrom, are patentable over Shendon.

Claims 31 and 35-49

New claims 31 and 35 recite that "the lower portion lacks any aperture from the top surface to the bottom surface of the lower portion".

In addition to the reasons for patentability over Shendon as set forth above, Shendon also fails to teach a retaining ring in which the lower portion lacks any aperture from its top surface to its bottom surface.

In Shendon, the wafer perimeter ring 162 includes holes 164 and counterbores 166 that provide apertures through the wafer perimeter ring, as shown in Figure 4:



Retaining ring screws 168 are placed through the holes 164 and counterbores 166 and threaded into threaded holes 160 in the backing ring 148 to hold the retaining ring 162 to the backing ring 148 (column 10, lines 26-33).

A problem with securing the wafer perimeter ring 162 to the backing ring 148, as shown in Shendon, by inserting screws from the bottom side through apertures, is that slurry can be captured in the spaces between the screws and aperture walls. This slurry can dry and become a source of particulates that cause scratching and defects on the wafers.

Since Shendon does not teach a retaining ring in which the lower portion lacks any aperture from the top surface to the bottom surface, claims 31 and 35, and the claims depending therefrom, are patentable over Shendon.

Claims 10, 22 and 44

Claims 10, 22 and 44 recite that the lower portion is adhesively attached to the upper portion.

The Examiner argues that epoxy adhesive is a well-known expedient in the art of bonding plastic to metals, and that that it would have been obvious to use an epoxy as an alternative to screw attachment. Applicant disagrees.

While the use of epoxies may be generally known to bond the plastic and metal, there are potential drawbacks to using an epoxy in a retaining ring. In particular, in operation, the retaining ring is subjected to significant lateral shear forces from the polishing pad. Applicant submits that a person of ordinary skill would be directed away from using epoxy due to the danger of failure of the epoxy as compared to a screw attachment.

Therefore, in addition to the reasons for patentability over Shendon as set forth above, claims 10, 22 and 44 are patentable over Shendon.

Therefore, in addition to the reasons for patentability over Shendon as set forth above, claims 34 and 49 are patentable over Shendon.

Applicants hereby petition under 37 C.F.R. §1.136 for a one month extension of time.

Applicants request consideration of the Information Disclosure Statement being filed with this response.

The fees for the extension of time in the amount of \$120, the excess claims fees in the amount of \$1,160, and the Information Disclosure Statement in the amount of \$180 are being paid concurrently herewith on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

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